

A NEW COSTA RICAN SPECIES OF *JAPANAGROMYZA* (DIPTERA:  
AGROMYZIDAE) FORMING GALLS ON *Lonchocarpus* (FABACEAE)

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**Abstract.**—*Japanagromyza lonchocarpi* Boucher, n. sp., is described from specimens reared from petiole-rachis galls on *Lonchocarpus oliganthus* F.J. Herm. (Fabaceae) in Costa Rica. This is the first record of a *Japanagromyza* species forming petiole or rachis galls and also the first record of an agromyzid feeding on *Lonchocarpus*.

**Key Words:** Agromyzidae, *Japanagromyza*, galls, *Lonchocarpus*, Fabaceae, systematics, Neotropical

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*Japanagromyza* Sasakawa is a small genus of agromyzid flies with 71 species found worldwide. There are 26 species known from the Neotropical Region (Martinez and Etienne 2002). Species with known life history are almost all leaf miners. They form large blotch mines on the leaves of their host plant, and subsequently pupate in the soil. However, gall induction by members of this genus has been observed on rare occasions. Spencer (1963) reared specimens of *Japanagromyza frosti* (Frick) from stem-galls on an unidentified plant in Costa Rica and Étienne and Martinez (2003) obtained specimens of *Japanagromyza inferna* Spencer from leaf galls on *Centrosema virginianum* (L.) (Fabaceae) in Guadeloupe. Here we record a new species of *Japanagromyza* forming a petiole and rachis gall on *Lonchocarpus oliganthus* F. J. Herm. (Fabaceae) in Costa Rica.

#### MATERIALS AND METHODS

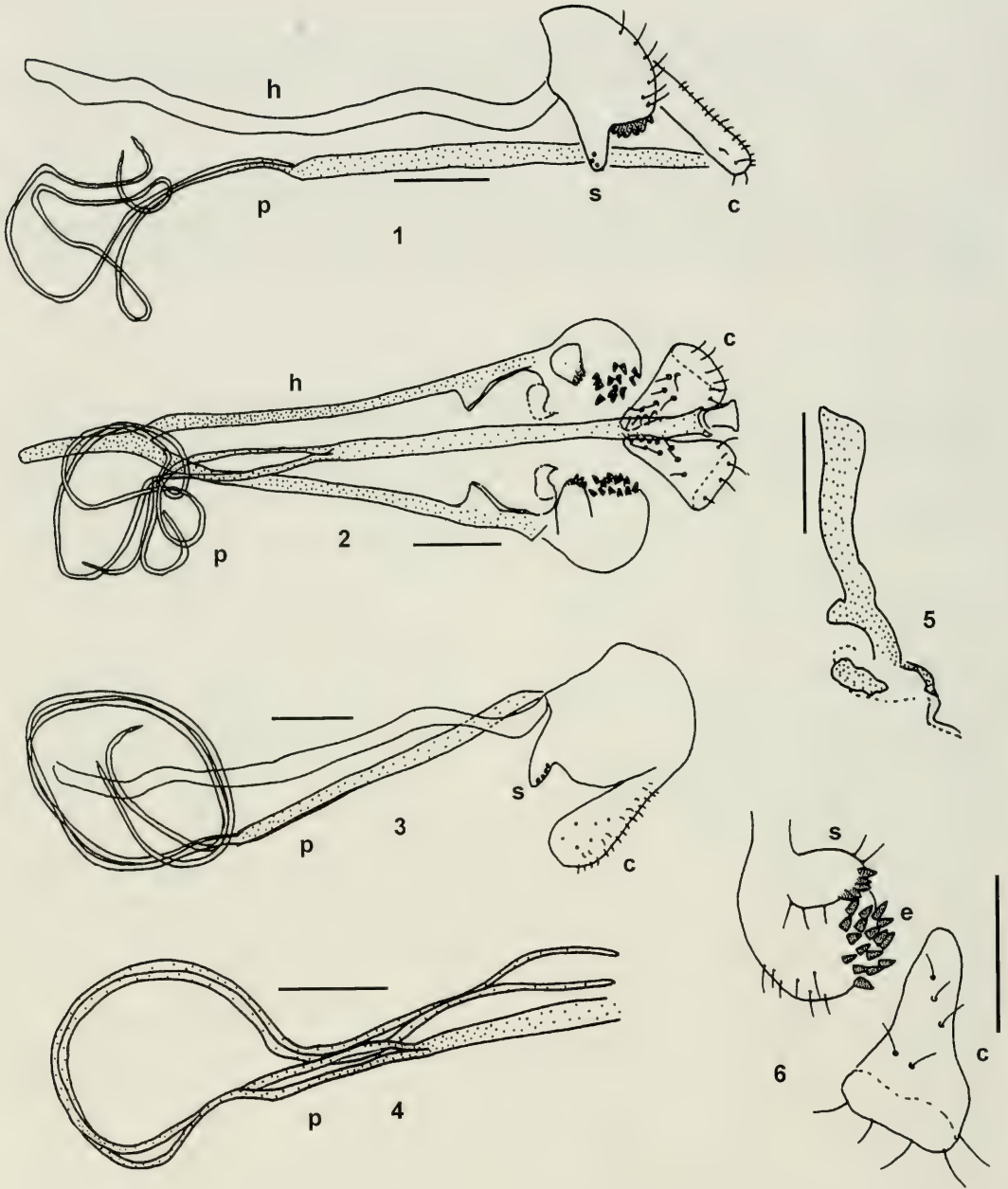
Galls were collected from a sapling in a regenerating, former coffee plantation (the Leonel Oviedo reserve) on the University of Costa Rica campus. Both gall collection and

adult emergence occurred during October, 2000. Galls were reared in transparent plastic bags and emerging adults were preserved in 75% alcohol, then later dried with HMDS (hexamethyldisilazane). Dissection of male genitalia follows procedures in Boucher (2002). Morphological terminology follows McAlpine (1981), except that the orbital and frontal setae are referred to as *ors* and *ori*, respectively, in accordance with common usage in agromyzid literature.

Type specimens are deposited in the following collections (acronyms used in the text are in parentheses): Instituto Nacional de Biodiversidad, Santo Domingo de Heredia, Costa Rica (INBio); Lyman Entomological Museum, McGill University, Ste-Anne-de-Bellevue, QC, Canada (LEM); National Museum of Natural History, Smithsonian Institution, Washington, DC, USA (USNM).

#### *Japanagromyza lonchocarpi* Boucher, new species (Figs. 1–7)

**Diagnosis.**—This species can be distinguished from other Neotropical species of



Figs.1-6. Male genitalia of *Japanagromyza lonchocarpi*. 1, Lateral view. 2, Ventral view. 3, Lateral view (variation). 4, Ventrolateral view of phallus (variation). 5, Ejaculatory apodeme. 6, Epandrium with surstylus and cercus (ventral, left). Abbreviations: c, cercus; e, inner corner of epandrium; h, hypandrium; p, phallus; s, surstylus. Scale bars = 0.1 mm

*Japanagromyza* by the combination of the following characters: prescutellar bristles absent, two strong *ors* present, fringe of calypter white, male cerci without strong spines, and the shape of the phallus.

Description.—Head including antenna, mat brown. Posterior and ventral margin of gena a little darker, brownish black. Thorax with a greenish metallic sheen; calypter including margin and fringe white; halter completely white. Legs brown. Abdomen with a bronze and/or green metallic sheen.

Frons narrow, width 0.31–0.35 mm; ratio of frons width to eye width 0.95–1.1; orbit 0.18 times width of frons at midpoint; frons not projecting above or in front of eye in profile; lunule with silvery pubescence best seen in posterodorsal view; 2 strong reclinate *ori* and 2 strong reclinate *ors*; orbital setulae upright or reclinate, reaching level of posterior *ors*; in some specimens orbital setulae in two rows anterior to lower *ors*; first flagellomere small, rounded, slightly pubescent; arista as long as eye height with short pubescence; gena deepest at rear; gena height at midpoint: 0.13–0.15 times eye height. Two strong postsutural dorsocentrals; acrostichals numerous, 8–9 rows; prescutellar acrostichal bristles absent. Foretibia with one (rarely two) posterior bristle, near midpoint, midtibia with two posterodorsal bristles near midpoint. Wing length 2.4–2.6 mm;  $R_{4+5}$  ending close to wing tip; costa extending to  $M_{1+2}$ ; second costal sector 3.8–4.0 times length of fourth; last section of  $CuA_1$ : 0.70–0.77 times length of penultimate. Cross-vein r-m located at 0.4 length of cell dm.

Male genitalia: Phallus with variable long coiled distal tubules (Fig. 1–4), surstylus with 5–6 stout spines at apex (Fig. 6). Surstylus elongated in side view and fused with epandrium (Fig. 1). Cercus greatly enlarged without strong bristles or spines, only weak hairs present (Fig. 6). Epandrium with many stout spines on inner corner (Fig. 6). Ejaculatory apodeme narrow and elongated (Fig. 5).

Female ovipositor short and retracted.

Type material.—Holotype ♂: COSTA RICA, San José, San Pedro de Montes de Oca, (9°56'N, 84°03'W), 1200 m, ex *Lonchocarpus oliganthus*, petiole gall, x.2000, P. Hanson (INBio). Paratypes: 3 ♂, 3 ♀, same data as holotype (INBio); 6 ♂, 4 ♀, same data as holotype (LEM); 2 ♂, 2 ♀, same data as holotype (USNM).

Etymology.—The species name is derived from the generic name of the host plant.

Host plant and life history.—This species forms galls on the petiole and rachis of *Lonchocarpus oliganthus* (Fig. 7). All 21 specimens were reared from a single gall and the puparia were found in a pile in the basal part of the gall chamber. Because this gall was partially dissected, natural emergence was not observed. Although the larvae were not observed, they presumably feed gregariously in a single gall. An unidentified microlepidopteran (possibly Cosmopterigidae; K. Nishida, personal communication) larva that bores into the young stems, petiole and rachis is found on the same plant, causing a similar gall. Empty galls of both *J. lonchocarpi* and the lepidopteran are frequently colonized by various species of ants, some of which tend mealybugs within the empty gall chamber.

#### DISCUSSION

Host plants in nine different families have been recorded for *Japanagromyza* species but members of this genus are best represented on the Fabaceae, subfamily Papilionoideae (Spencer 1990). The host of *Japanagromyza lonchocarpi*, *Lonchocarpus oliganthus*, is in the subfamily Papilionoideae and this represents the first record of an agromyzid species feeding on *Lonchocarpus*. Although *Lonchocarpus oliganthus* is restricted to Central America, the genus *Lonchocarpus* is widespread in Central and South America. It is possible that *J. lonchocarpi* may feed on other species of *Lonchocarpus* and might be more widely distributed than presently known.

There are published records of leaf-min-



Fig. 7. Gall of *Japanagromyza lonchocarpi* on *Lonchocarpus oliganthus*.

ing species of Agromyzidae in which multiple larvae develop in a single mine. For example, up to five larvae of *J. etiennei* Martinez (Martinez 1994), and up to 20 larvae of *Chromatomyia alpigenae* (Hendel) (Griffiths 1974) can develop in the same mine. Very few gall-inducing agromyzid species are known, but according to published data, larvae of gall forming species are often solitary (e.g., *Hexomyza cecidigena* (Hering) (Spencer 1976), *H. simplicoides* (Hendel) (Yamazaki 2001)) or develop in a small group of less than five larvae (e.g., *Japanagromyza inferna* Spencer (Etienne and Martinez 2003)). Thus, having as many as 21 specimens of *J. lonchocarpi* developing in a single gall seems quite unusual.

There are still many species of *Japanagromyza* whose biology is unknown. Three species, all from the Neotropical region, are now known to induce galls. It is to be expected that more described and undescribed species are also gall inducers.

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#### LITERATURE CITED

- Boucher, S. 2002. Revision of Nearctic species of *Cerodontha* (*Cerodontha*) (Diptera: Agromyzidae). *The Canadian Entomologist* 134: 577–603.
- Etienne, J. and M. Martinez. 2003. Les Agromyzidae de Guadeloupe: Espèces nouvelles et notes additionnelles (Diptera). *Nouvelle Revue d'Entomologie* 19: 249–272.
- Griffiths, G. C. D. 1974. Studies on boreal Agromyzidae (Diptera). V. On the genus *Chromatomyia* Hardy, with revision of Caprifoliaceae-mining species. *Quaestiones Entomologicae* 10: 35–69.
- Martinez, M. 1994. *Japanagromyza etiennei* n.sp. (Diptera: Agromyzidae) ravageur potential des *Phaseolus* spp. [Leguminosae] dans les caraïbes.

- Revue Française d'entomologie (nouvelle serie) 16: 81–85.
- Martínez, M. and J. Etienne. 2002. Liste systématique et biogéographique des Agromyzidae (Diptera) de la région néotropicale. *Bollettino di zoologia agraria e di Bachicoltura*, Ser.II, 34: 25–52.
- McAlpine, J. F. 1981. Morphological terminology—adults, pp. 9–63. *In* McAlpine, J. F. et al., eds. *Manual of Nearctic Diptera*, Vol. 1. Monograph No. 27, Research Branch, Agriculture Canada. 674 pp.
- Spencer, K. A. 1963. A synopsis of the Neotropical Agromyzidae (Diptera). *Transactions of the Royal Entomological Society of London* 115: 291–389.
- . 1976. The Agromyzidae (Diptera) of Fennoscandia and Denmark. *Fauna Entomologica Scandinavica*, Vol. 5, Part 1, 304 pp.
- . 1990. Host specialization in the World Agromyzidae (Diptera). *Series Entomologica* 45. Kluwer Academic Publishers, Dordrecht, 444 pp.
- Yamazaki, K. 2001. Preference-performance linkage in the willow twig-galling agromyzid fly, *Hexomyza simplicoides* (Diptera: Agromyzidae) on the willow *Salix chaenomeloides*. *Entomological Science* 4: 301–306.